

REMARKS

Applicants reply to the Office Action mailed February 13, 2007, within three months. The Examiner has rejected all pending claims 1, 4-21, and 23-25. In this Response, Applicants amend claims 1, 6, 7, 9, and 17, cancel claims 8 and 18-25, and add new claims 26 and 27. Support for the amendments is found in the originally-filed specification, claims, and figures. No new matter has been added. Upon entry of the foregoing amendments, Applicants respectfully request reconsideration of pending claims 1, 4-7, 9-17, 26, and 27 (1 independent claims, 16 claims total) in light of the following Remarks.

Claim Rejections under 35 USC §103(a)

A. U.S. Patent 5,622,615 (Young et al.) in view of U.S. Patent 3,972,795 (Goens et al.)

Pending claims 1, 4-7, 8-14, 18, and 22 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 5,622,615 (“Young”) in view of U.S. Patent 3,972,795 (“Goens”). Applicants respectfully traverse as set forth herein. Additionally, claims 8 and 18-25 have been cancelled. Accordingly, Applicants request withdrawal of any rejections of these claims.

More precisely, the Examiner asserts that Young teaches a method for electrowinning copper including providing an electrolyte cell containing at least one anode and at least one cathode, wherein at least a portion of ferrous ions are oxidized to ferric ions at the anode, and operating the cell at a voltage below 1.5V and a current density greater than 26 A/ft² (\approx 280 A/m²).

Significantly, the Examiner correctly asserts that Young **does not** disclose a flow through-anode. To remedy, the Examiner asserts that one of skill in the art would combine the process disclosed in Young with the flow-through cell of Geons. Assuming arguendo that the combination of Young and Geons is proper, and without Applicants conceding much, Applicants submit that Young and Geons do not disclose each and every element of claim 1 as presently amended.

In this regard, claim 1 as presently recited is as follows:

A method of electrowinning copper comprising:
providing an electrolytic cell comprising **at least one flow-through anode** and at least one cathode, wherein said cathode has an active surface area;

providing a flow of electrolyte to said electrolytic cell, wherein said electrolyte comprising copper and solubilized ferrous iron, and **wherein said electrolyte flow is provided to said electrolytic cell via an electrolyte manifold comprising a plurality of injection holes;**

oxidizing at least a portion of said solubilized ferrous iron in said electrolyte at the at least one flow-through anode from ferrous iron to ferric iron;

removing at least a portion of said copper from said electrolyte at the at least one cathode; and

operating said electrolytic cell at a cell voltage and at a current density, wherein said cell voltage is less than about 1.5 Volts and wherein said current density is greater than about 26 amperes per square foot of active cathode.

As such, Applicants submit that neither Young nor Geons teach, suggest, or motivate “**an electrolyte manifold [for supplying electrolyte] comprising a plurality of injection holes,**” as presently recited. As cited by the Examiner, Goens discloses an axial flow-through electrolytic cell (*inter alia*, col. 7, lines 54-57). Alternatively, the present invention allows for increased mass transport of ferric ions to the anode and copper ions to the cathode resulting in a decrease in overall cell voltage – an advantage over either the Young processes or Goens cell configuration.

Accordingly, Applicants submit that Young and Geons fail to disclose each and every element of the presently recited invention and assert that pending independent claim 1 is patentable over the combination of these references.

Additionally, claims that variously depend from claim 1 are likewise allowable. In some exemplary embodiments, claims 9, 26, and 27, which depend from claim 1 and incorporate all recited claim 1 limitations, define further structural limitations not taught, suggested, or motivated by Young and Geons. The method according to claim 1, wherein said at least one flow-through anode comprises a metallic mesh.

Thus, Applicants respectfully request withdrawal of the rejection of pending claims 1, 4-7, and 9-14 and submit that all pending claims have been placed in condition for allowance.

B. Young in view of Goens U.S. Patent 5,492,608 (Sandoval et al.)

Pending claims 15-17 and 23-25 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Young in view of Goens in further view of U.S. Patent 5,492,608 (“Sandoval”). Applicants respectfully traverse as set forth herein. Additionally, claims 8 and

18-25 have been cancelled. Accordingly, Applicants request withdrawal of any rejections of these claims.

More precisely, the Examiner asserts that Sandoval teaches a method for electrowinning copper including recycling an electrolyte through an activated carbon module and exposing the electrolyte to sulfur dioxide gas to reduce ferric ions back to ferrous ions.

In response, Applicants submit that because claims 15-17 variously depend from claim 1, they likewise require **“at least one flow-through anode [supplied with electrolyte from] an electrolyte manifold comprising a plurality of injection holes”** and Sandoval does not teach, suggest, or motivate **“at least one flow-through anode,”** as presently recited. Alternatively, Sandoval discloses cathode plates and anode plates that are solid and that “hang down” into the electrolyte flow. (Col. 4, lines 44-59). Applicants submit that Sandoval does not disclose a flow-through anode and that there is no suggestion, motivation, or teaching in either Sandoval or Goens to combine the flow-through electrolytic cell of Goens with the electrolyte flow manifold of Sandoval.

As previously argued, Applicants submit that the combination of the flow-through cell and the electrolyte manifold with a plurality of injection holes allows for increased mass transport of ferric ions to the anode and copper ions to the cathode resulting in a decrease in overall cell voltage. This combination allows for a reduction in energy consumption and an increase electrowinning output over and above either the Young processes, Goens cell configuration, or the Sandoval electrolyte manifold, individually.

Accordingly, Applicants respectfully request withdrawal of the rejection of pending claims 15-17 and submit that all pending claims have been placed in condition for allowance.

CONCLUSION

Applicants respectfully submit that the application is in condition for examination on the merits, and that the claims as amended are patentable. Applicant respectfully requests allowance of all pending claims. The Examiner is invited to telephone the undersigned at (602) 382-6301 at the Examiner's convenience, if that would help further prosecution of the subject Application.

Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account No. 19-2814. **This statement does NOT authorize charge of the issue fee.**

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